



LEED v4 for BD+C: Schools Project Checklist

Project Name: King Open and Cambridge St Upper Schools and Community Complex
 Date: 10/26/2016
 Prepared By: SSC

Y	?	N	Credit 1	Integrative Process	1
1	0	0			
14 0 1 Location and Transportation 15					
0	0	na	Credit 1	LEED for Neighborhood Development Location	15
1	0	0	Credit 2	Sensitive Land Protection	1
2	0	0	Credit 3	High Priority Site	2
5	0	0	Credit 4	Surrounding Density and Diverse Uses	5
4	0	0	Credit 5	Access to Quality Transit	4
1	0	0	Credit 6	Bicycle Facilities	1
0	0	1	Credit 7	Reduced Parking Footprint	1
1	0	0	Credit 8	Green Vehicles	1

Y	?	N	Credit 1	Integrative Process	1
4 2 6 Sustainable Sites 12					
Y			Prereq 1	Construction Activity Pollution Prevention	Required
Y			Prereq 2	Environmental Site Assessment	Required
1	0	0	Credit 1	Site Assessment	1
0	0	2	Credit 2	Site Development - Protect or Restore Habitat	2
1	0	0	Credit 3	Open Space	1
0	0	3	Credit 4	Rainwater Management	3
2	0	0	Credit 5	Heat Island Reduction	2
0	1	0	Credit 6	Light Pollution Reduction	1
0	0	1	Credit 7	Site Master Plan	1
0	1	0	Credit 8	Joint Use of Facilities	1

Y	?	N	Credit 1	Integrative Process	1
9 0 3 Water Efficiency 12					
Y			Prereq 1	Outdoor Water Use Reduction	Required
Y			Prereq 2	Indoor Water Use Reduction	Required
Y			Prereq 3	Building-Level Water Metering	Required
1	0	1	Credit 1	Outdoor Water Use Reduction	2
7	0	0	Credit 2	Indoor Water Use Reduction	7
0	0	2	Credit 3	Cooling Tower Water Use	2
1	0	0	Credit 4	Water Metering	1

Y	?	N	Credit 1	Integrative Process	1
23 3 5 Energy and Atmosphere 31					
Y			Prereq 1	Fundamental Commissioning and Verification	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Building-Level Energy Metering	Required
Y			Prereq 4	Fundamental Refrigerant Management	Required
4	0	2	Credit 1	Enhanced Commissioning	6
16	0	0	Credit 2	Optimize Energy Performance	16
0	0	1	Credit 3	Advanced Energy Metering	1
0	0	2	Credit 4	Demand Response (All electric site)	2
3	0	0	Credit 5	Renewable Energy Production	3
0	1	0	Credit 6	Enhanced Refrigerant Management	1
0	2	0	Credit 7	Green Power and Carbon Offsets	2

2	11	0	Materials and Resources	13	
Y			Prereq 1	Storage and Collection of Recyclables	Required
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required
0	5	0	Credit 1	Building Life-Cycle Impact Reduction	5
0	2	0	Credit 2	Building Product Disclosure and Optimization - Environmental Product Declarations	2
0	2	0	Credit 3	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
0	2	0	Credit 4	Building Product Disclosure and Optimization - Material Ingredients	2
2	0	0	Credit 5	Construction and Demolition Waste Management	2

7	8	1	Indoor Environmental Quality	16	
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke Control	Required
Y			Prereq 3	Minimum Acoustic Performance	Required
2	0	0	Credit 1	Enhanced Indoor Air Quality Strategies	2
0	2	1	Credit 2	Low-Emitting Materials	3
1	0	0	Credit 3	Construction Indoor Air Quality Management Plan	1
1	1	0	Credit 4	Indoor Air Quality Assessment	2
0	1	0	Credit 5	Thermal Comfort	1
2	0	0	Credit 6	Interior Lighting	2
0	3	0	Credit 7	Daylight	3
1	0	0	Credit 8	Quality Views	1
0	1	0	Credit 9	Acoustic Performance	1

6	0	0	Innovation	6	
1	0	0	Credit 1.1	Exemplary Performance Eac 5 Renewable Energy Production 100%	1
1	0	0	Credit 1.2	Exemplary Performance MRc5 Construction and Demolition Waste Manage	1
1	0	0	Credit 1.3	Innovation: Building as a Teaching Tool	1
1	0	0	Credit 1.4	Pilot Credit: Food Production	1
1	0	0	Credit 1.5	Pilot Credit: Social Equity within Project Team (Construction Workers)	1
1	0	0	Credit 2	LEED Accredited Professional	1

4	0	0	Regional Priority	4	
1	0	0	Credit 1	Regional Priority: High Priority Site	1
1	0	0	Credit 2	Regional Priority: Indoor Water Use Reduction 4 of 7 points	1
1	0	0	Credit 3	Regional Priority: Optimize Energy Performance 8 of 16 points	1
1	0	0	Credit 4	Regional Priority: Renewable Energy Production 2 of 3 points	1

70 24 16 TOTALS Possible Points: 110
 Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110

LEED & SUSTAINABILITY NARRATIVE**LEED/SUSTAINABILITY NARRATIVE LEED BD+C: SCHOOLS | V4 - LEED V4**

PART 1. KING OPEN/CAMBRIDGE STREET UPPER SCHOOL AND COMMUNITY PROJECT IS PURSUING A NET ZERO ENERGY GOAL WITH A MINIMUM OF LEED SLIVER CERTIFICATION. THE PROJECT IS CURRENTLY TRACKING 70 POINTS IN THE YES COLUMN WITH 24 STUDY CREDITS IN THE MAYBE COLUMN. FURTHER STUDY OVER THE COMING WEEKS AND MONTHS WILL DETERMINE FINAL CREDIT ACHIEVEMENT. WE HAVE OUTLINED, IN THE NARRATIVE BELOW, HOW THE PROJECT INTENDS TO ACHIEVE THE PREREQUISITES AND CREDITS FOR THE LEED FOR SCHOOLS VERSION 4 CERTIFICATION.

PART 2.

A. Credit 1 -Integrative process

The Integrative Process credit goes beyond checklists and encourages integration during early design stages, when clarifying the owner's aspirations, performance goals, and project needs will be most effective in improving performance. An integrative process comprises three phases.

1. The first—discovery—is also the most important and can be seen as an expansion of what is conventionally called predesign. Actions taken during discovery are essential to achieving a project's environmental goals cost-effectively. 2.

2. The second phase, design and construction, begins with what is conventionally called schematic design. Unlike its conventional counterpart, however, in the integrative process, design will incorporate all of the collective understandings of system interactions that were found during discovery. The third phase is the period of occupancy, operations, and performance feedback. Here, the integrative process measures performance and sets up feedback mechanisms. Feedback is critical to determining success in achieving performance targets, informing building operations, and taking corrective action when targets are missed

Project is targeting this credit.

B. Location and Transportation

1. Credit 2- Sensitive land protection
 - a. Option 1. Locate the development footprint on land that has been previously developed.

Site is previously developed.

2. Credit 3-High priority site
 - a. Option 3. Brownfield remediation (2 points BD&C except Core and Shell, 3 points Core and Shell)

Locate on a brownfield where soil or groundwater contamination has been identified, and where the local, state, or national authority (whichever has jurisdiction) requires its remediation. Perform remediation to the satisfaction of that authority.

Site is contaminated and will be remediated.

3. Credit 4- Surrounding density and diverse uses
 - a. Option 1. Surrounding density (2–3 points)

Locate on a site whose surrounding existing density within a ¼-mile [400-meter] radius of the project boundary meets the values in Table 1. Use either the “separate residential and nonresidential densities” or the “combined density” values.
 - b. Table 1a. Points for average density within 1/4 mile of project site (IP units)

Combined density	Separate residential and nonresidential densities		Points BD&C (except Core and Shell)	Points BD&C (Core and Shell)	Points ID&C
	Square feet per acre of buildable land	Residential density (DU/acre)			
22,000	7	0.5	2	2	3
35,000	12	0.8	3	4	6

c. Table 1b. Points for average density within 400 meters of project site (SI units)

Combined density	Separate residential and nonresidential densities		Points BD&C (except Core and Shell)	Points BD&C (Core and Shell)	Points ID&C
	Square meters per hectare of buildable land	Residential density (DU/hectare)			
5,050	17.5	0.5	2	2	3
8,035	30	0.8	3	4	6

DU = dwelling unit; FAR = floor-area ratio.

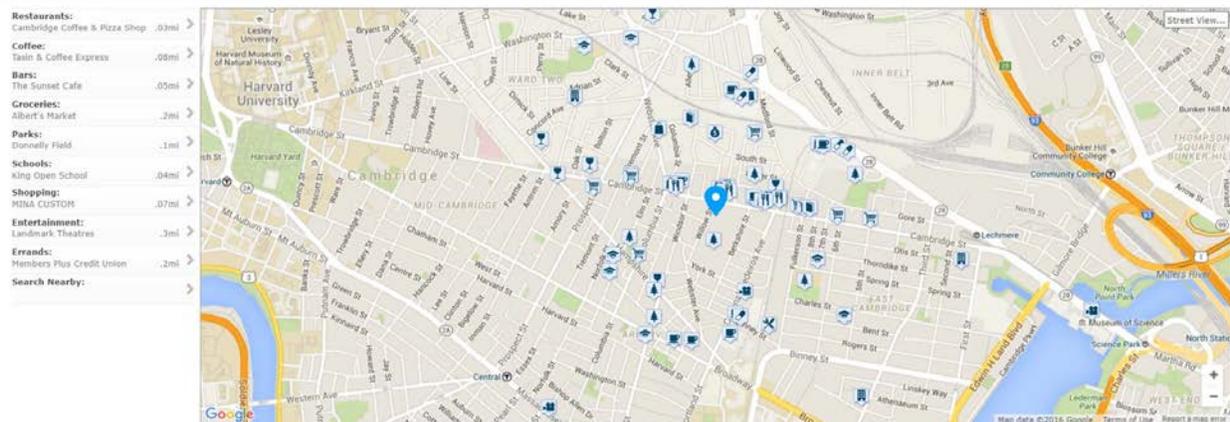
Physical education spaces that are part of the project site, such as playing fields and associated buildings used during sporting events only (e.g., concession stands) and playgrounds with play equipment, are excluded from the development density calculations.

AND/OR

- d. Option 2. Diverse uses (1–2 points)

Construct or renovate a building or a space within a building such that the building's main entrance is within a ½-mile (800-meter) walking distance of the main entrance of four to seven (1 point) or eight or more (2 points) existing and publicly available diverse uses (listed in Appendix 1).

What's Nearby



Project is anticipating achieving all 5 points in for this credit.

4. Credit 5- Access to quality transit

- a. Option 1. Transit-served location (1–3 points)

Locate any functional entry of the project within a ¼-mile (400-meter) walking distance of existing or planned bus, streetcar, or rideshare stops, or within a ½-mile (800-meter) walking distance of existing or planned bus rapid transit stops, light or heavy rail stations, commuter rail stations or ferry terminals. The transit service at those stops and stations must meet the minimums listed in Tables 1 and 2. Planned stops and stations may count if they are sited, funded, and under construction by the date of the certificate of occupancy and are complete within 24 months of that date.

Qualifying transit routes must have paired route service (service in opposite directions).

For each qualifying transit route, only trips in one direction are counted towards the threshold.

If a qualifying transit route has multiple stops within the required walking distance, only trips from one stop are counted towards the threshold.

- b. Table 1. Minimum daily transit service for projects with multiple transit types (bus, streetcar, rail, or ferry)

Weekday trips	Points
72	1
144	2
360	3

- c. Table 2. Minimum daily transit service for projects with commuter rail or ferry service only

Weekday trips	Points
24	1
40	2
60	3

Projects served by two or more transit routes such that no one route provides more than 60% of the prescribed levels may earn one additional point, up to the maximum 3 points.

If existing transit service is temporarily rerouted outside the required distances for less than two years, the project may meet the requirements, provided the local transit agency has committed to restoring the routes with service at or above the prior level.

OR

d. Option 2. Pedestrian access (1–3 points)

Show that the project has an attendance boundary such that the specified percentages of students live within no more than a 3/4-mile (1200-meter) walking distance (for grades 8 and below, or ages 14 and below), and 1 1/2-mile (2400-meter) walking distance (for grades 9 and above or ages 15 and above) of a functional entry of a school building. Points are awarded according to Table 3.

e. Table 3. Points for student population within walking distance

Percentage of students	Points
50%	1
60%	2
70% or more	3

In addition, locate the project on a site that allows pedestrian access to the site from all residential neighborhoods that house the planned student population.

Project anticipates achieving all four points related to this credit

5. Credit 6- Bicycle facilities

a. Bicycle network

Design or locate the project such that a functional entry and/or bicycle storage is within a 200-yard (180-meter) walking distance or bicycling distance of a bicycle network that connects to at least one of the following

- at least 10 diverse uses (see Appendix 1); or
- a bus rapid transit stop, light or heavy rail station, commuter rail station, or ferry terminal.

All destinations must be within a 3-mile (4800-meter) bicycling distance of the project boundary.

Provide dedicated bicycle lanes that extend at least to the end of the school property with no barriers (e.g., fences) on school property.

b. Bicycle Storage and Shower Rooms

Provide long-term bicycle storage for at least 5% of regular building occupants (excluding students grade 3 and below), but no fewer than four storage spaces per building.

Provide at least one on-site shower with changing facility for the first 100 regular building occupants (excluding all students) and one additional shower for every 150 regular building occupants (excluding all students) thereafter.

Project is achieving this credit; further study is required.

6. Credit 8- Green Vehicles

a. Requirements

b. Option 1. Green passenger vehicles

Designate 5% of all parking spaces used by the project as preferred parking for green vehicles. Clearly identify and enforce for sole use by green vehicles. Distribute preferred parking spaces proportionally among various parking sections (e.g. between short-term and long-term spaces).

Path 1. Electric vehicle charging

Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project. Clearly identify and reserve these spaces for the sole use by plug-in electric vehicles. EVSE parking spaces must be provided in addition to preferred parking spaces for green vehicles.

Project is achieving this credit, Option 1 and path 1 will be pursued.

C. Sustainable Sites

1. Prereq 1- Construction activity pollution prevention

Create and implement an erosion and sedimentation control plan for all construction activities associated with the project. The plan must conform to the erosion and sedimentation requirements of the 2012 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) or local equivalent, whichever is more stringent. Projects must apply the CGP regardless of size. The plan must describe the measures implemented.

Project will comply

2. Prereq 2- Environmental site assessment

Conduct a Phase I Environmental Site Assessment as described in ASTM E1527–05 (or a local equivalent) to determine whether environmental contamination exists at the site. If contamination is suspected, conduct a Phase II Environmental Site Assessment as described in ASTM E1903–11 (or a local equivalent).

If a site is contaminated, remediate the site to meet local, state, or national environmental protection agency region residential (unrestricted) standards, whichever are most stringent.

Project completed a Phase II assessment, remediation will be performed.

3. Credit 1- Site assessment

Complete and document a site survey or assessment¹ that includes the following information:

- *Topography.*
- *Hydrology.*
- *Climate.*
- *Vegetation.*
- *Soils.*
- *Human use.*
- *Human health effects.*

The survey or assessment should demonstrate the relationships between the site features and topics listed above and how these features influenced the project design; give the reasons for not addressing any of those topics.

Project completed a site assessment, survey will be provided by the team

4. Credit 2- Site development - protect or restore habitat

Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist).

AND

a. Option 1. on-site restoration (2 points except healthcare, 1-point healthcare)

Using native or adapted vegetation, restore 30% (including the building footprint) of all portions of the site identified as previously disturbed. Projects that achieve a density of 1.5 floor-area ratio may include vegetated roof surfaces in this calculation if the plants are native or adapted, provide habitat, and promote biodiversity.

Restore all disturbed or compacted soils that will be revegetated within the project's development footprint to meet the following requirements²:

- Soils (imported and in situ) must be reused for functions comparable to their original function.
- Imported topsoils or soil blends designed to serve as topsoil may not include the following:
 - soils defined regionally by the Natural Resources Conservation Service web soil survey (or local equivalent for projects outside the U.S.) as prime farmland, unique farmland, or farmland of statewide or local importance; or
 - soils from other greenfield sites, unless those soils are a byproduct of a construction process.

Restored soil must meet the criteria of reference soils in categories 1–3 and meet the criteria of either category 4 or 5:

- organic matter;
- compaction;
- infiltration rates;
- soil biological function; and
- soil chemical characteristics.

Project teams may exclude vegetated landscape areas that are constructed to accommodate rainwater infiltration from the vegetation and soils requirements, provided all such rainwater infiltration areas are treated consistently with SS Credit Rainwater Management.

Dedicated athletic fields that are solely for athletic uses are exempted from the soil restoration criteria. These areas may not count toward the minimum required area.

Project is not able to meet this credit.

5. Credit 3- Open space

Provide outdoor space greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy.

The outdoor space must be physically accessible and be one or more of the following:

- a pedestrian-oriented paving or turf area with physical site elements that accommodate outdoor social activities;
- a recreation-oriented paving or turf area with physical site elements that encourage physical activity;
- a garden space with a diversity of vegetation types and species that provide opportunities for year-round visual interest;
- a garden space dedicated to community gardens or urban food production;
- preserved or created habitat that meets the criteria of SS Credit Site Development—Protect or Restore Habitat and also includes elements of human interaction.

For projects that achieve a density of 1.5 floor-area ratio (FAR), and are physically accessible, extensive or intensive vegetated roofs can be used toward the minimum 25% vegetation requirement, and qualifying roof-based physically accessible paving areas can be used toward credit compliance.

Wetlands or naturally designed ponds may count as open space if the side slope gradients average 1:4 (vertical: horizontal) or less and are vegetated.

Project is achieving this credit.

6. Credit 4- Rainwater management

- a. Option 1. Percentile of rainfall events
- b. Path 1. 95th percentile (2 points except Healthcare, 1 point Healthcare)

In a manner best replicating natural site hydrology processes, manage on site the runoff from the developed site for the 95th percentile of regional or local rainfall events using low-impact development (LID) and green infrastructure.

Use daily rainfall data and the methodology in the U.S. Environmental Protection Agency (EPA) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to determine the 95th percentile amount.

OR

- c. Path 2. 98th percentile (3 points except Healthcare, 2 points Healthcare)

Achieve Path 1 but for the 98th percentile of regional or local rainfall events, using LID and green infrastructure.

OR

- d. Path 3. Zero lot line projects only – 85th Percentile (3 points except Healthcare, 2 points Healthcare))

The following requirement applies to zero lot line projects in urban areas with a minimum density of 1.5 FAR. In a manner best replicating natural site hydrology processes, manage on site the runoff from the developed site for the 85th percentile of regional or local rainfall events, using LID and green infrastructure.

OR

- e. Option 2. Natural land cover conditions (3 points except Healthcare, 2 points Healthcare)

Manage on site the annual increase in runoff volume from the natural land cover condition to the post developed condition.

Projects that are part of a multitenant complex only

The credit requirements may be met using a coordinated approach affecting the defined project site that is within the master plan boundary. Distributed techniques based on a watershed approach are then required.

Project is not able to achieve this credit.

7. Credit 5- Heat island reduction

- a. Option 2. parking under cover (1 point)

Place a minimum of 75% of parking spaces under cover. Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32 (if three-year aged value in-

formation is not available, use materials with an initial SRI of at least 39 at installation), (2) be a vegetated roof, or (3) be covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.

Project will comply with parking below a compliant roof and compliant hardscape.

8. Credit 6- Light pollution reduction

Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

Meet these requirements for all exterior luminaires located inside the project boundary (except those listed under “Exemptions”), based on the following:

- the photometric characteristics of each luminaire when mounted in the same orientation and tilt as specified in the project design; and
- the lighting zone of the project property (at the time construction begins). Classify the project under one lighting zone using the lighting zones definitions provided in the Illuminating Engineering Society and International Dark Sky Association (IES/IDA) Model Lighting Ordinance (MLO) User Guide.

Additionally, meet the internally illuminated signage requirement.

- a. Uplight
- b. Option 1. BUG rating method

Do not exceed the following luminaire uplight ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.

Project is targeting this credit, but may be difficult to achieve, further study is needed.

9. Credit 7 -Site master plan

The project must achieve at least four of the following six credits, using the associated calculation methods. The achieved credits must then be recalculated using the data from the master plan.

- LT Credit: High Priority Site

- SS Credit: Site Development—Protect or Restore Habitat
- SS Credit: Open Space
- SS Credit: Rainwater Management
- SS Credit: Heat Island Reduction
- SS Credit: Light Pollution Reduction

A site master plan for the school must be developed in collaboration with school authorities. Previous sustainable site design measures should be considered in all master-planning efforts so that existing infrastructure is retained whenever possible. The master plan must therefore include current construction activity plus future construction (within the building's lifespan) that affects the site. The master plan development must also include parking, paving, and utilities.

Projects where no future development is planned are not eligible for this credit.

Project is not completing additional development on this site and therefore isn't eligible for this credit.

10. Credit 8 -Joint use of facilities

- a. Option 1. Make building space open to the general public (1 point)

In collaboration with the school authorities, ensure that at least three of the following types of spaces in the school are accessible to and available for shared use by the general public:

- auditorium;
- gymnasium;
- cafeteria; one or more classrooms;
- playing fields and stadiums; and
- joint parking.
- Provide access to toilets in joint-use areas after normal school hours.

OR

- b. Option 2. Contract with specific organizations to share building space (1 point)

In collaboration with the school authorities, contract with community or other organizations to provide at least two types of dedicated-use spaces in the building, such as the following:

commercial office;

health clinic;

community service centers (provided by state or local offices);

police office;

library or media center;

parking lot;

one or more commercial businesses.

Provide access to toilets in joint-use areas after normal school hours.

OR

c. Option 3. Use shared space owned by other organizations (1 point)

In collaboration with the school authorities, ensure that at least two of the following six types of spaces that are owned by other organizations or agencies are accessible to students:

auditorium;

gymnasium;

cafeteria;

one or more classrooms;

swimming pool; and

playing fields and stadiums.

Provide direct pedestrian access to these spaces from the school. In addition, provide signed joint-use agreements with the other organizations or agencies that stipulate how these spaces will be shared.

Project is targeting this credit; further study is needed.

D. Water Efficiency

1. Prereq 1- Outdoor water use reduction

Reduce outdoor water use through one of the following options. Nonvegetated surfaces, such as permeable or impermeable pavement, should be excluded from landscape area calculations. Athletic fields and playgrounds (if vegetated) and food gardens may be included or excluded at the project team's discretion.

a. Option 1. No irrigation required

Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period.

OR

b. Option 2. Reduced irrigation

Reduce the project's landscape water requirement by at least 30% from the calculated baseline for the site's peak. Reductions must be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.

Project will comply with option 2. Project is looking at cistern for irrigation.

2. Prereq 2- Indoor water use reduction

a. Building Water Use

For the fixtures and fittings listed in Table 1, as applicable to the project scope, reduce aggregate water consumption by 20% from the baseline. Base calculations on the volumes and flow rates shown in Table 1.

All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense labeled (or a local equivalent for projects outside the U.S.).

Project will comply. Rainwater collection for flushing is being proposed.

3. Prereq 3- Building-level water metering

Install permanent water meters that measure the total potable water use for the building and associated grounds. Meter data must be compiled into monthly and annual summaries; meter readings can be manual or automated.

Commit to sharing with USGBC the resulting whole-project water usage data for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first.

This commitment must carry forward for five years or until the building changes ownership or lessee.

Project will comply.

4. Credit 1- Outdoor water use reduction

Reduce outdoor water use through one of the following options. Nonvegetated surfaces, such as permeable or impermeable pavement, should be excluded from landscape area calculations. Athletic fields and playgrounds (if vegetated) and food gardens may be included or excluded at the project team's discretion.

- a. Option 1. No irrigation required (2 points except Healthcare, 1 point Healthcare)

Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period.

OR

- b. Option 2. Reduced irrigation (1-2 points except Healthcare, 1 point Healthcare)

Reduce the project's landscape water requirement (LWR) by at least 50% from the calculated baseline for the site's peak watering month. Reductions must first be achieved through plant species selection and irrigation system efficiency as calculated in the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.

Additional reductions beyond 30% may be achieved using any combination of efficiency, alternative water sources, and smart scheduling technologies.

Project will comply with Option 2.

5. Credit 2- Indoor water use reduction

Further reduce fixture and fitting water use from the calculated baseline in WE Prerequisite Indoor Water Use Reduction. Additional potable water savings can be earned above the prerequisite level using alternative water sources. Include fixtures and fittings

necessary to meet the needs of the occupants. Some of these fittings and fixtures may be outside the tenant space (for Commercial Interiors) or project boundary (for New Construction). Points are awarded according to Table 1.

a. Table 1. Points for reducing water use

Percentage reduction	Points (BD&C)	Points (Schools, Retail, Hospitality, Healthcare)	Points (ID&C)	Points (CI Retail)	Points (CI Hospitality)
25%	1	1	2	2	2
30%	2	2	4	4	4
35%	3	3	6	6	6
40%	4	4	8	8	8
45%	5	5	10	10	10
50%	6	--	12	--	11

Meet the percentage reduction requirements above.

b. AND

c. Appliance and process water

Install equipment within the project scope that meets the minimum requirements in Table 2, 3, 4, or 5. One point is awarded for meeting all applicable requirements in any one table. All applicable equipment listed in each table must meet the standard.

Schools, Retail, and Healthcare projects can earn a second point for meeting the requirements of two tables.

Project will achieve all 7 points.

6. Credit 4- Water metering

Install permanent water meters for two or more of the following water subsystems, as applicable to the project:

-Irrigation. Meter water systems serving at least 80% of the irrigated landscaped area. Calculate the percentage of irrigated landscape area served as the total metered irrigated landscape area divided by the total irrigated landscape area. Landscape areas fully covered with xeriscaping or native vegetation that requires no routine irrigation may be excluded from the calculation.

-Indoor plumbing fixtures and fittings. Meter water systems serving at least 80% of the indoor fixtures and fitting described in WE Prerequisite Indoor Water Use Reduction, either directly or by deducting all other measured water use from the measured total water consumption of the building and grounds.

-Domestic hot water. Meter water use of at least 80% of the installed domestic hot water heating capacity (including both tanks and on-demand heaters)

-Boiler with aggregate projected annual water use of 100,000 gallons (378 500 liters) or more, or boiler of more than 500,000 BtuH (150 kW). A single makeup meter may record flows for multiple boilers.

-Reclaimed water. Meter reclaimed water, regardless of rate. A reclaimed water system with a makeup water connection must also be metered so that the true reclaimed water component can be determined.

-Other process water. Meter at least 80% of expected daily water consumption for process end uses, such as humidification systems, dishwashers, clothes washers, pools, and other subsystems using process water.

Project will comply.

E. Energy & Atmosphere

1. Prereq 1- Fundamental commissioning and verification

a. Commissioning Process Scope

Complete the following commissioning (Cx) process activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies, in accordance with ASHRAE

Guideline 0-2005 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems, as they relate to energy, water, indoor environmental quality, and durability.

Requirements for exterior enclosures are limited to inclusion in the owner's project requirements (OPR) and basis of design, as well as the review of the OPR, BOD and project design. NIBS Guideline 3-2012 for Exterior Enclosures provides additional guidance.

Project will comply.

2. Prereq 2- Minimum energy performance

a. Option 1. Whole-building energy simulation

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata ([or a USGBC-approved equivalent standard for projects outside the U.S.](#)), using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

Project will comply.

3. Prereq 3- Building-level energy metering

Install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc). Utility-owned meters capable of aggregating building-level resource use are acceptable.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first. At a minimum, energy consumption must be tracked at one-month intervals.

This commitment must carry forward for five years or until the building changes ownership or lessee.

Project will comply.

4. Prereq 4- Fundamental refrigerant management

Do not use chlorofluorocarbon (CFC)-based refrigerants in new heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems. When reusing existing HVAC&R equipment, complete a comprehensive CFC phase-out conversion before project completion. Phase-out plans extending beyond the project completion date will be considered on their merits.

Existing small HVAC&R units (defined as containing less than 0.5 pound (225 grams) of refrigerant) and other equipment, such as standard refrigerators, small water coolers, and any other equipment that contains less than 0.5 pound (225 grams) of refrigerant, are exempt.

Project will comply.

5. Credit 1- Enhanced commissioning

Commissioning authority

- a. Option 1. Enhanced systems commissioning (3-4 points)
- b. Path 1: Enhanced commissioning (3 points)

Complete the following commissioning process (CxP) activities for mechanical, electrical, plumbing, and renewable systems and assemblies in accordance with ASHRAE Guideline 0–2005 and ASHRAE Guideline 1.1–2007 for HVAC&R systems, as they relate to energy, water, indoor environmental quality, and durability.

The commissioning authority must do the following:

- Review contractor submittals.
- Verify inclusion of systems manual requirements in construction documents.
- Verify inclusion of operator and occupant training requirements in construction documents.
- Verify systems manual updates and delivery.
- Verify operator and occupant training delivery and effectiveness.
- Verify seasonal testing.
- Review building operations 10 months after substantial completion.
- Develop an on-going commissioning plan
- Include all enhanced commissioning tasks in the OPR and BOD.

OR

- c. Path 2: Enhanced and monitoring-based commissioning (4 points)

Achieve Path 1.

AND

Develop monitoring-based procedures and identify points to be measured and evaluated to assess performance of energy- and water-consuming systems.

Project will comply with Path 2: Enhanced and Monitoring-Based Commissioning (4 points)

6. Credit 2- Optimize energy performance

Establish an energy performance target no later than the schematic design phase. The target must be established as kBtu per square foot-year (kW per square meter-year) of source energy use.

Choose one of the options below.

- a. Option 1. Whole-building energy simulation (1–18 points except Schools and Healthcare, 1–16 points Schools, 1–20 points Healthcare)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy for that credit before conducting the energy simulation.

Project will achieve all 16 points; the target is net zero.

7. Credit 3- Advanced energy metering

Install advanced energy metering for the following:

-all whole-building energy sources used by the building; and

-any individual energy end uses that represent 10% or more of the total annual consumption of the building.

The advanced energy metering must have the following characteristics.

Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.

Electricity meters must record both consumption and demand. Whole-building electricity meters should record the power factor, if appropriate.

The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.

The system must be capable of storing all meter data for at least 36 months.

The data must be remotely accessible.

All meters in the system must be capable of reporting hourly, daily, monthly, and annual energy use.

Project will have metering but won't be pursuing this credit.

8. Credit 4-Demand response

Design building and equipment for participation in demand response programs through load shedding or shifting. On-site electricity generation does not meet the intent of this credit.

a. Case 1. Demand response program available (2 points)

Participate in an existing demand response (DR) program and complete the following activities.

Design a system with the capability for real-time, fully-automated DR based on external initiation by a DR Program Provider. Semi-automated DR may be utilized in practice.

Enroll in a minimum one-year DR participation amount contractual commitment with a qualified DR program provider, with the intention of multiyear renewal, for at least 10% of the estimated peak electricity demand. Peak demand is determined under EA Pre-requisite Minimum Energy Performance.

Develop a comprehensive plan for meeting the contractual commitment during a Demand Response event.

Include the DR processes in the scope of work for the commissioning authority, including participation in at least one full test of the DR plan.

b. Case 2. Demand response program not available (1 point)

Provide infrastructure to take advantage of future demand response programs or dynamic, real-time pricing programs and complete the following activities.

Install interval recording meters with communications and ability for the building automation system to accept an external price or control signal.

Develop a comprehensive plan for shedding at least 10% of building estimated peak electricity demand. Peak demand is determined under EA Prerequisite Minimum Energy Performance.

Include the DR processes in the scope of work for the commissioning authority, including participation in at least one full test of the DR plan.

Contact local utility representatives to discuss participation in future DR programs.

Project will not be pursuing.

9. Credit 5- Renewable energy production

Use renewable energy systems to offset building energy costs. Calculate the percentage of renewable energy with the following equation:

% renewable energy =	Equivalent cost of usable energy produced by the renewable energy system
	Total building annual energy cost

Use the building’s annual energy cost, calculated in EA Prerequisite Minimum Energy Performance, if Option 1 was pursued; otherwise use the U.S. Department of Energy’s Commercial Buildings Energy Consumption Survey (CBECS) database to estimate energy use and cost.

The use of solar gardens or community renewable energy systems is allowed if both of the following requirements are met.

The project owns the system or has signed a lease agreement for a period of at least 10 years.

The system is located with the same utility service area as the facility claiming the use.

Credit is based on the percentage of ownership or percentage of use assigned in the lease agreement. Points are awarded according to Table 1.

a. Table 1. Points for renewable energy

Percentage renewable energy	Points (except CS)	Points (CS)
1%	1	1
3%	—	2
5%	2	3
10%	3	—

Project will comply, the target is all three points.

10. Credit 6- Enhanced refrigerant management

a. Option 1. No refrigerants or low-impact refrigerants (1 point)

Do not use refrigerants, or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50.

OR

Option 2. Calculation of refrigerant impact (1 point)

Select refrigerants that are used in heating, ventilating, air-conditioning, and refrigeration (HVAC&R) equipment to minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. The combination of all new and existing base building and tenant HVAC&R equipment that serve the project must comply with the following formula:

Project is evaluating compliance; final calculations will be provided when systems are selected.

11. Credit 7 - Green power and carbon offsets

Engage in a contract for qualified resources that have come online since January 1, 2005, for a minimum of five years, to be delivered at least annually. The contract must specify the provision of at least 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

Green power and RECs must be Green-e Energy certified or the equivalent. [Europe ACP: Green Power] [South America ACP: Green Power] RECs can only be used to mitigate the effects of Scope 2, electricity use.

Carbon offsets may be used to mitigate Scope 1 or Scope 2 emissions on a metric ton of carbon dioxide-equivalent basis and must be Green-e Climate certified, or the equivalent.

Percentage of total energy addressed by green power, RECs and/or offsets Points

50% 1

100% 2

Use the project's annual energy consumption, calculated in EA Prerequisite Minimum Energy Performance, if Option 1 was pursued; otherwise use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) database to estimate energy use.

Project is evaluating compliance.

F. Materials & Resources

1. Prereq 1- Storage and collection of recyclables

Provide dedicated areas accessible to waste haulers and building occupants for the collection and storage of recyclable materials for the entire building. Collection and storage areas may be separate locations. Recyclable materials must include mixed paper, corrugated cardboard, glass, plastics, and metals. Take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste.

Project will comply.

2. Prereq 2- Construction and demolition waste management planning

Develop and implement a construction and demolition waste management plan:

Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.

Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facility will process the material.

Provide a final report detailing all major waste streams generated, including disposal and diversion rates.

Alternative daily cover (ADC) does not qualify as material diverted from disposal. Include materials destined for ADC in the calculations as waste. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

Project will comply.

3. Credit 1- Building life-cycle impact reduction

Demonstrate reduced environmental effects during initial project decision-making by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment. Achieve one of the following options.

OR

a. Option 3. building and material reuse (2–4 points)

Reuse or salvage building materials from off site or on site as a percentage of the surface area, as listed in Table 1. Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems). Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Materials contributing toward this credit may not contribute toward MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials.

Project will evaluate compliance.

4. Credit 2- Building product disclosure and optimization - environmental product declarations

MR Credit 2, Building Product Disclosure and Optimization, Environmental Product Declarations (EPD): At least 20 different products from at least five different manufacturers

shall have Environmental Product Declarations (EPDs) that comply with LEED requirements. Industry-wide (generic) Environmental Product Declarations (EPDs) shall be valued as one-half of a product.

Project will evaluate compliance.

5. Credit 3- Building product disclosure and optimization - sourcing of raw materials

MR Credit 3, Building Product Disclosure and Optimization, Sourcing of Raw Materials: At least 20 different products from at least five different manufacturers shall have publicly released reports that comply with LEED requirements for raw material source and extraction reporting. Self-declared reports by manufacturers shall be valued as one-half of a product.

Project will evaluate compliance.

6. Credit 4- Building product disclosure and optimization - material ingredients

MR Credit 4, Building Product Disclosure and Optimization, Material Ingredients: At least 20 different products from at least five different manufacturers shall have material ingredients reported to 0.1% (1,000 ppm).

Project will evaluate compliance.

7. Credit 5- Construction and demolition waste management

Recycle and/or salvage nonhazardous construction and demolition materials. Calculations can be by weight or volume but must be consistent throughout.

Exclude excavated soil, land-clearing debris from calculations. Include materials destined for alternative daily cover (ADC) in the calculations as waste (not diversion). Include wood waste converted to fuel (bio-fuel) in the calculations; other types of waste-to-energy are not considered diversion for this credit.

However, for projects that cannot meet credit requirements using reuse and recycling methods, waste-to-energy systems may be considered waste diversion if the European Commission Waste Framework Directive 2008/98/EC and Waste Incineration Directive 2000/76/EC are followed and Waste to Energy facilities meet applicable European Committee for Standardization (CEN) EN 303 standards.

- a. Option 1. diversion (1-2 points)
- b. Path 1. divert 50% and three material streams (1 point)

Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams.

OR

- c. Path 2. divert 75% and four material streams (2 points)

Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams.

OR

- d. Option 2. reduction of total waste material (2 points)

Do not generate more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building's floor area.

Project will divert over 90% of construction waste.

G. Indoor Environmental Quality

1. Prereq 1- Minimum indoor air quality performance

Meet the requirements for both ventilation and monitoring.

- a. Option 1. ASHRAE Standard 62.1–2010

For mechanically ventilated spaces (and for mixed-mode systems when the mechanical ventilation is activated), determine the minimum outdoor air intake flow for mechanical ventilation systems using the ventilation rate procedure from ASHRAE 62.1–2010 or a local equivalent, whichever is more stringent.

Meet the minimum requirements of ASHRAE Standard 62.1–2010, Sections 4–7, Ventilation for Acceptable Indoor Air Quality (with errata), or a local equivalent, whichever is more stringent.

Project will comply.

2. Prereq 2- Environmental tobacco smoke control

Prohibit smoking on site.

Signage must be posted at the property line indicating the no-smoking policy.

Project will comply.

3. Prereq 3- Minimum acoustic performance

a. HVAC background noise

Achieve a maximum background noise level of 40 dBA from heating, ventilating, and air-conditioning (HVAC) systems in classrooms and other core learning spaces. Follow the recommended methodologies and best practices for mechanical system noise control in ANSI Standard S12.60–2010, Part 1, Annex A.1; the 2011 HVAC Applications ASHRAE Handbook, Chapter 48, Noise and Vibration Control (with errata); AHRI Standard 885–2008; or a local equivalent for projects outside the U.S.

b. Exterior noise

For high-noise sites (peak-hour Leq above 60 dBA during school hours), implement acoustic treatment and other measures to minimize noise intrusion from exterior sources and control sound transmission between classrooms and other core learning spaces. Projects at least one-half mile (800 meters) from any significant noise source (e.g., aircraft overflights, highways, trains, industry) are exempt.

c. Reverberation time

Adhere to the following reverberation time requirements.

Classrooms and core learning spaces < 20,000 cubic feet (566 cubic meters)

Design classrooms and other core learning spaces to include sufficient sound-absorptive finishes for compliance with the reverberation time requirements specified in ANSI Standard S12.60–2010, Part 1, Acoustical Performance Criteria, Design Requirements and Guidelines for Schools, or a local equivalent for projects outside the U.S.

Option 1-For each room, confirm that the total surface area of acoustic wall panels, ceiling finishes, and other sound-absorbent finishes equals or exceeds the total ceiling area of the room (excluding lights, diffusers, and grilles). Materials must have an NRC of 0.70 or higher to be included in the calculation.

OR

Option 2

Confirm through calculations described in ANSI Standard S12.60-2010 that rooms are designed to meet reverberation time requirements as specified in that standard.

Classrooms and core learning spaces ≥ 20,000 cubic feet (566 cubic meters)

Meet the recommended reverberation times for classrooms and core learning spaces described in the NRC-CNRC Construction Technology Update No. 51, Acoustical Design of Rooms for Speech (2002), or a local equivalent for projects outside the U.S.

Exceptions

Exceptions to the requirements because of a limited scope of work or to observe historic preservation requirements will be considered.

Project will comply.

4. Credit 1- Enhanced indoor air quality strategies

a. Option 1. Enhanced IAQ strategies (1 point)

Comply with the following requirements, as applicable.

Mechanically ventilated spaces:

A. Entryway systems

Install permanent entryway systems at least 10 feet (3 meters) long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entrances. Acceptable entryway systems include permanently installed grates, grilles, slotted systems that allow for cleaning underneath, rollout mats, and any other materials manufactured as entryway systems with equivalent or better performance. Maintain all on a weekly basis.

B. Interior cross-contamination prevention

Sufficiently exhaust each space where hazardous gases or chemicals may be present or used (e.g., garages, housekeeping and laundry areas, copying and printing rooms), using the exhaust rates determined in EQ Prerequisite Minimum Indoor Air Quality Performance or a minimum of 0.50 cfm per square foot (2.54 l/s per square meter), to create negative pressure with respect to adjacent spaces when the doors to the room are closed. For each of these spaces, provide self-closing doors and deck-to-deck partitions or a hard-lid ceiling.

C. Filtration

Each ventilation system that supplies outdoor air to occupied spaces must have particle filters or air-cleaning devices that meet one of the following filtration media requirements

Project will meet both options.

5. Credit 2- Low emitting materials

This credit includes requirements for product manufacturing as well as project teams. It covers volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined. Different materials must meet different requirements to be considered compliant for this credit. The building interior and exterior are organized in seven categories, each with different thresholds of compliance. The building interior is defined as everything within the waterproofing membrane. The building exterior is defined as everything outside and inclusive of the primary and secondary weatherproofing system, such as waterproofing membranes and air- and water-resistive barrier materials.

a. Option 1. Product Category Calculations

Achieve the threshold level of compliance with emissions and content standards for the number of product categories listed in Table 2.

b. Table 1. Thresholds of compliance with emissions and content standards for 7 categories of materials

Category	Threshold	Emissions and content requirements
Interior paints and coatings applied on site	At least 90%, by volume, for emissions; 100% for VOC content	General Emissions Evaluation for paints and coatings applied to walls, floors, and ceilings VOC content requirements for wet applied products
Interior adhesives and sealants applied on site (including flooring adhesive)	At least 90%, by volume, for emissions; 100% for VOC content	General Emissions Evaluation VOC content requirements for wet applied products
Flooring	100%	General Emissions Evaluation
Composite wood	100% not covered by other categories	Composite Wood Evaluation

Ceilings, walls, thermal, and acoustic insulation	100%	General Emissions Evaluation Healthcare, Schools only Additional insulation requirements
Furniture (include in calculations if part of scope of work)	At least 90%, by cost	Furniture Evaluation
Healthcare and Schools Projects only: Exterior applied products	At least 90%, by volume	Exterior Applied Products

Project will evaluate compliance.

6. Credit 3- Construction indoor air quality management plan

Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building. The plan must address all of the following.

During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.

Protect absorptive materials stored on-site and installed from moisture damage.

Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, as determined by ASHRAE 52.2–2007, with errata (or equivalent filtration media class of F5 or higher, as defined by CEN Standard EN 779–2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance, [\[East Asia ACP: Construction IAQ Equivalent\]](#)), are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer's recommendations.

Prohibit the use of tobacco products inside the building and within 25 feet (8 meters) of the building entrance during construction.

Project will comply.

7. Credit 4 - Indoor air quality assessment

Select one of the following two options, to be implemented after construction ends and the building has been completely cleaned. All interior finishes, such as millwork, doors, paint, carpet, acoustic tiles, and movable furnishings (e.g., workstations, partitions), must be installed, and major VOC punch list items must be finished. The options cannot be combined.

- a. Option 1. Flush-out (1 point)
- b. Path 1. Before occupancy

Install new filtration media and perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot (4 267 140 liters of outdoor air per square meter) of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%.

OR

- c. Path 2. During occupancy

If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of 3,500 cubic feet of outdoor air per square foot (1 066 260 liters of outdoor air per square meter) of gross floor area while maintaining an internal temperature of at least 60°F (15°C) and no higher than 80°F (27°C) and relative humidity no higher than 60%.

Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic foot per minute (cfm) per square foot of outdoor air (1.5 liters per second per square meter of outdoor air) or the design minimum outdoor air rate determined in EQ Prerequisite Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outdoor air (4 270 liters of outdoor air per square meter) has been delivered to the space.

OR

- d. Option 2. Air testing (2 points)

After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing using protocols consistent with the methods listed in Table 1 for all occupied spaces. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use. Retail projects may conduct the testing within 14 days of occupancy.

Project will evaluate compliance for both options.

8. Credit 5- Thermal comfort

Meet the requirements for both thermal comfort design and thermal comfort control.

a. Thermal comfort design- Option 1. ASHRAE Standard 55-2010

Design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55–2010, Thermal Comfort Conditions for Human Occupancy, with errata or a local equivalent.

For natatoriums, demonstrate compliance with ASHRAE HVAC Applications Handbook, 2011 edition, Chapter 5, Places of Assembly, Typical Natatorium Design Conditions, with errata.

OR

b. Option 2. ISO and CEN Standards

Design HVAC systems and the building envelope to meet the requirements of the applicable standard:

ISO 7730:2005, Ergonomics of the Thermal Environment, analytical determination and interpretation of thermal comfort, using calculation of the PMV and PPD indices and local thermal comfort criteria; and

CEN Standard EN 15251:2007, Indoor Environmental Input Parameters for Design and Assessment of Energy Performance of Buildings, addressing indoor air quality, thermal environment, lighting, and acoustics, Section A2.

c. Thermal comfort control

Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multi occupant spaces, and for any individual occupant spaces without individual controls.

Thermal comfort controls allow occupants, whether in individual spaces or shared multioccupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed, and humidity.

Project will evaluate compliance.

9. Credit 6- Interior lighting

Select one or both of the following two options.

a. Option 1. Lighting control (1 point)

For at least 90% of individual occupant spaces, provide individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, off, midlevel). Midlevel is 30% to 70% of the maximum illumination level (not including daylight contributions).

For all shared multioccupant spaces, meet all of the following requirements.

-Have in place multizone control systems that enable occupants to adjust the lighting to meet group needs and preferences, with at least three lighting levels or scenes (on, off, midlevel).

-Lighting for any presentation or projection wall must be separately controlled.

-Switches or manual controls must be located in the same space as the controlled luminaires. A person operating the controls must have a direct line of sight to the controlled luminaires.

AND/OR

b. Option 2. Lighting quality (1 point)

Choose four of the following strategies.

1. For all regularly occupied spaces, use light fixtures with a luminance of less than 2,500 cd/m² between 45 and 90 degrees from nadir. Exceptions include wallwash fixtures properly aimed at walls, as specified by manufacturer's data, indirect uplighting fixtures, provided there is no view down into these uplights from a regularly occupied space above, and any other specific applications (i.e. adjustable fixtures).

2. For the entire project, use light sources with a CRI of 80 or higher. Exceptions include lamps or fixtures specifically designed to provide colored lighting for effect, site lighting, or other special use.
3. For 75% of the total connected lighting load, use light sources that have a rated life (or L70 for LED sources) of at least 24,000 hours (at 3-hour per start, if applicable).
4. Use direct-only overhead lighting for 25% or less of the total connected lighting load for all regularly occupied spaces.
5. For 90% of the regularly occupied floor area, meet the following thresholds for area-weighted average surface reflectance: 85% for ceilings, 60% for walls, and 25% for floors.
6. If furniture is included in the scope of work, select furniture finishes to meet the following thresholds for area-weighted average surface reflectance: 45% for work surfaces, and 50% for movable partitions.
7. For 75% of the regularly occupied floor area, meet ratio of average wall surface illuminance (excluding fenestration) to average work plane (or surface, if defined) illuminance that does not exceed 1:10. Must also meet strategy E, strategy F, or demonstrate area-weighted surface reflectance of 60% for walls
8. For 75% of the regularly occupied floor area, meet ratio of average ceiling illuminance (excluding fenestration) to work surface illuminance that does not exceed 1:10. Must also meet strategy E, strategy F, or demonstrate area-weighted surface reflectance of 85% for ceilings.

Project will be meeting both options.

10. Credit 7- Daylight

Provide manual or automatic (with manual override) glare-control devices for all regularly occupied spaces.

Select one of the following three options.

- a. Option 1. Simulation: Spatial Daylight Autonomy (2–3 points, 1-2 points Healthcare)

Demonstrate through annual computer simulations that spatial daylight autonomy $mY_{300/50\%}$ ($sDA_{300/50\%}$) of at least 55%, 75%, or 90% is achieved. Use regularly occupied floor area. Healthcare projects should use the perimeter area determined under EQ Credit Quality Views. Points are awarded according to Table 1.

b. Table 1. Points for daylit floor area: Spatial daylight autonomy

New Construction, Core and Shell, Schools, Retail, Data Centers, Warehouses & Distribution Centers, CI, Hospitality		Healthcare	
sDA (for regularly occupied floor area)	Points	sDA (for perimeter floor area)	Points
55%	2	75%	1
75%	3	90%	2

AND

Demonstrate through annual computer simulations that annual sunlight exposure_{1000,250} (ASE_{1000,250}) of no more than 10% is achieved. Use the regularly occupied floor area that is daylit per the sDA_{300/50%} Simulations.

The sDA and ASE calculation grids should be no more than 2 feet (600 millimeters) square and laid out across the regularly occupied area at a work plane height of 30 inches (76 millimeters) above finished floor (unless otherwise defined). Use an hourly time-step analysis based on typical meteorological year data, or an equivalent, for the nearest available weather station. Include any permanent interior obstructions. Movable furniture and partitions may be excluded.

c. Option 2. Simulation: Illuminance Calculations (1–2 points)

Demonstrate through computer modeling that illuminance levels will be between 300 lux and 3,000 lux for 9 a.m. and 3 p.m., both on a clear-sky day at the equinox, for the floor area indicated in Table 2. Use regularly occupied floor area. Healthcare projects should use the perimeter area determined under EQ Credit Quality Views.

Project will evaluate compliance.

11. Credit 8 - Quality views

Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area. View glazing in the contributing area must provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

Additionally, 75% of all regularly occupied floor area must have at least two of the following four kinds of views:

-multiple lines of sight to vision glazing in different directions at least 90 degrees apart;

-views that include at least two of the following: (1) flora, fauna, or sky; (2) movement; and (3) objects at least 25 feet from the exterior of the glazing;

-unobstructed views located within the distance of three times the head height of the vision glazing; and

views with a view factor of 3 or greater, as defined in “Windows and Offices; A Study of Office Worker Performance and the Indoor Environment.”

Include in the calculations any permanent interior obstructions. Movable furniture and partitions may be excluded.

Views into interior atria may be used to meet up to 30% of the required area.

Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area.

View glazing in the contributing area must provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

Project will evaluate compliance.

12. Credit 9- Acoustic performance

a. HVAC Background noise

Achieve a background noise level of 35 dBA or less from heating, ventilating, and air-conditioning (HVAC) systems in classrooms and other core learning spaces. Follow the recommended methodologies and best practices for mechanical system noise control in ANSI Standard S12.60–2010, Part 1, Annex B; the 2011 HVAC Applications ASHRAE Handbook, Chapter 48, Sound and Vibration Control, with errata; AHRI Standard 885–2008; or a local equivalent.

b. Sound Transmission

Design classrooms and other core learning spaces to meet the sound transmission class (STC) requirements of ANSI S12.60–2010 Part 1, or a local equivalent. Exterior windows must have an STC rating of at least 35, unless outdoor and indoor noise levels can be verified to justify a lower rating.

Project will evaluate compliance. This may be difficult to achieve.

H. Innovation

Project teams can use any combination of innovation, pilot, and exemplary performance strategies.

1. Exemplary Performance Eac 5 Renewable Energy Production 100%
2. Exemplary Performance MRc5 Construction and Demolition Waste Management 90%
3. Innovation: Building as a Teaching Tool
4. Pilot Credit: Food Production
5. Pilot Credit: Social Equity within Project Team (Construction Workers)
6. LEED Accredited Professional-Colleen Soden LEED AP BD&C

I. Regional priority

Earn up to four of the six Regional Priority credits. These credits have been identified by the USGBC regional councils and chapters as having additional regional importance for the project's region. A database of Regional Priority credits and their geographic applicability is available on the USGBC website, www.usgbc.org/rpc.

- a. Regional Priority: High Priority Site
- b. Regional Priority: Indoor Water Use Reduction 4 of 7 points
- c. Regional Priority: Optimize Energy Performance 8 of 16 points
- d. Regional Priority: Renewable Energy Production 2 of 3 points